



Design of an IoT based autonomous vehicle with the aid of computer vision

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ABSTRACT- The autonomous vehicle concept all started with the advancement of driver assistance and has extended to a new level that now it is semi-autonomous and autonomous vehicle. In this connection an attempt is made to integrate obstacle detection and lane detection. An HD Pi camera along with ultrasonic sensor and IR sensors are used to provide necessary data from the real world to the car. Many existing methods like lane detection, obstacle detection are combined together to provide the necessary control to the car. This car will also have limited automation features like obstacle avoidance system and lane detection system so that it can drive itself safely in case of connectivity failure. A miniature car including the above features has been developed which showed optimum performance in a simulated environment. The system mainly consists of a Raspberry Pi, a Pi camera, internet modem. The Raspberry Pi was mainly used for the Computer Vision algorithms and for streaming video through internet. The proposed system is very cheap and very efficient in terms automation.

INDEX TERMS: Internet of things (IoT), Raspberry Pi, Pi camera, Ultrasonic sensor, IR sensors, L293D motor driver.

I. INTRODUCTION

With the ever-growing technological advancement, human civilization is looking for automation in every sphere of life. Automated car is one of the latest trends which has been massively recognized by people all around the world as they want maximum security and comfort during driving. Nowadays, road accident is one of the prime concerns for the people. It became very frequent and uncertain. Most of the road accidents occur due to lack of abidance of the traffic rules. Most of the time, the drivers become drowsy or distracted during driving and eventually hit objects ahead of them. If the driving process can be handled with the aid of Computer Vision and efficient sensors then the risk of human mistakes can be highly reduced. Besides, sometimes it gets necessary to access the car from a remote location in order to reduce hassles. In this case, it would be a lot more convenient if the car could be viewed from a remote computer and driven by interaction through the computer keyboard. This could be as easy as playing a computer game. Our work is based on Internet of Things technology and Computer Vision to control to mobile application our vehicle and automation features.

II. LITERATURE REVIEW:

In past, the following works were carried out by people. Gurjashan Singh Pannu, Mohammad Dawud and Pritha Gupta, "Design and Implementation of Autonomous Car using

Raspberry Pi"- (2015), In this paper focus is on building a monocular vision autonomous car prototype using Raspberry Pi as a processing chip. An HD camera along with an ultrasonic sensor is used to provide necessary data from the real world to the car. The car is capable of reaching the given destination safely and intelligently thus avoiding the risk of human errors. Many existing algorithms like lane detection, obstacle detection are combined together to provide the necessary control to the car.

Sumit Garethiya¹, LohitUjjainiya and VaidehiDudhwadkar, "predictive vehicle collision avoidance system using Raspberry – Pi"- (2015) In this paper, an effective method is proposed for the collision avoidance system of a vehicle to detect the obstacle present in front and blind spot of the vehicle. The driver is made alert via a buzzer and LED indication as the distance between vehicle and obstacle reduces and is displayed on display board. The ultrasonic sensor detects the state of the object whether it is in motion or Arjun K1, Prithviraj and AshwithaA 528 Static with respect to the vehicle. This system is useful for detecting vehicle, motorcycle, bicycle and pedestrians that pass by the lateral side of vehicle. V.Sagar Reddy , Dr.L.PadmaSree , and V. Naveen Kumar, "Design and Development of accelerometer based System for driver safety" – (2014) This paper presents a new design of commodity hardware with cheap and it consumes very less power designed oriented product for getting information from accident location of driver drowsiness and indicating be alert to the driver in the prevention of accident. This system is designed by using Raspberry Pi (ARM11) for fast accessing to control and accelerometer for event detection. Is there any event is occurs the message sent to the authorized person so they can take immediate action to save the lives and reduce the damages. M.H Mohamad, Mohd Amin Bin Hasanuddin, MohdHafizzie Bin Ramli, "Vehicle Accident Prevention System Embedded with Alcohol Detector" – (2013) An efficient system of vehicle accident prevention system embedded by alcohol detector has been proposed. This system capable to alert the driver about the level of drunkenness by indicates the condition on LCD display. It also produce an alarm from buzzer to make the driver aware their own condition and to vigilant other people in surrounding area. The most safety element provided by this system is the driver in high level of drunkenness is not allowed to drive a car as the ignition system will be deactivated.

PROBLEM STATEMENT:

Here autonomous vehicle control by the internet but in some time internet connectivity is not good than autonomous car get

will be affected and if car going to out of station that also internet problem occur.

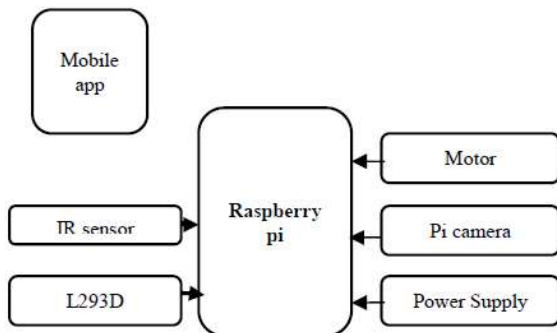
III. EXISTINGSYSTEM

A vehicle tracking system combines the use of automatic vehicle location in individual vehicles with software that collects these fleet data for a comprehensive picture of vehicle locations. Modern vehicle tracking systems commonly use GPS or GLONASS technology for locating the vehicle, but other types of automatic vehicle location technology can also be used. Vehicle information can be viewed on electronic maps via the Internet or specialized software. Urban public transit authorities are an increasingly common user of vehicle tracking systems, particularly in large cities.

IV. PROPOSED SYSTEM

In this proposed system we are going to use raspberry pi as a microcontroller, one pi cam, ir sensor and motors. The raspberry pi always connected with internet and through the app we can control the robot. The robot will consist wheels and each wheels is connected with the motors the motor movement we can control through the mobile app.in mobile app some switches option will be given like forward, left, right and stop. And there will be one another slot option to see the video streaming. So if we press particular switch according to that robot will move. In robot at front side one camera and three ir sensor will mount the pi cam connected with aspberry pi capture the videos and it will send the video to the web server. Out of three ir sensor two will be mounted at down side to follow the path and another sensor will used for obstacle avoider

V. SYSTEM ARCHITECTURE



VI. CONCLUSION:

A prototype was successfully implemented by which parameters of a vehicle were monitored and controlled & also

provides the remote control for the user by using Smartphone's. To control the parameters from anywhere, an IoT platform called 'UBIDOT' has been used. It is a codeless IoT platform designed to help prototype and scale IoT projects. This project can be extent by taking help of Google map to indicate the nearby fuel station.

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